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CATOSTOMUS SYNCHEILUS PALOUSEANUS, A NEW SUBSPECIES OF A CATOSTOMID FISH FROM THE PALOUSE RIVER (COLUMBIA R. SYSTEM).

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In 1932 Hubbs and Schultz described as new, *Catostomus syncheilus*, from the Columbia River. This well marked species was reported as occurring in Crab Creek, in Moses Lake, in a tributary of the Yakima River at Ellensburg, and in a tributary of the Snake River near King Hill, Idaho. Since that time much collecting has been done in eastern Washington and elsewhere in northwestern United States (Schultz and DeLacy 1935, 1936). A study of this material indicates that Hubbs and Schultz (1932 : 6) were partially correct in assuming that *C. syncheilus* "obviously has a wide range throughout the upper parts of the Columbia River system." However, the fine-scaled sucker of the Palouse River system differs so much from typical *syncheilus* in the middle Columbia River system, in the Snake River, and in many of their tributaries, that it must receive a new subspecific name, which we propose to call *Catostomus syncheilus palouseanus*, after the river in which it is found. The Columbia River form, then, takes the name *Catostomus syncheilus syncheilus*.

The Palouse River enters the Snake River about 12 miles south of Hooper, Washington. It is a small river that flows over lava rock throughout most of its course. A few miles below Hooper is to be found the Lower Palouse Falls, 196 feet high, which acts as a barrier to any upstream migration of fish and probably to downstream migration too. Below the falls, the "Palouse Canyon (the lower 10 miles of the river) is 400 to 800 feet deep in basalt" (Bretz 1928). The Palouse River Falls are rather old, dating back to at least the great Spokane flood which flowed southwestward

across eastern Washington and cut numerous coulees. Thus, the fish in the Palouse system have been isolated so that in addition to the fine-scaled sucker, we find above the falls *Richardsonius balteatus hydrophlox* and below the falls *Richardsonius balteatus balteatus.* There is a slight difference too between the *Cottus rotheus* above and below the falls, which we are not prepared to discuss at this time.

Catostomus syncheilus syncheilus has been taken from the following localities: Crab Creek—1 and 7 miles above Beverly, and at Smyrna, Washington, collectors Schultz and Erkila; Moses Lake, collector, S. J. Hutchinson; mouth of Umatilla River, Oregon, collectors Schultz and Bowers; Tucannon River, 45 miles east of Walla Walla, Washington, collectors Schultz and DeLacy; Grande Ronde River in Oregon—1 mile above Elgin, 1 mile below Perry, collectors Schultz and Bowers; Minam River, 1 mile above Minam, Oregon, collectors Schultz and Bowers; Wallowa Lake, Oregon, collector William Nicholson; Weiser River, 1 mile above Weiser, Idaho, collectors Schultz and DeLacy; Clearwater River near Lewiston, Idaho, collector Arthur Svihla; Rock Island Dam of Columbia River, near Wenatchee, collector, L. Royal and assistant; Little Deep Creek, 9 miles south of Chattaroy, Washington, collectors Schultz and Bowers; Little Spokane River near Dartford, Washington, collectors Schultz and Bowers; Malheur River, 8 miles above Drewsey, Oregon, collectors Schultz and Welander.

Extensive collecting of fine-scaled suckers in Glacier National Park, Montana, by the senior author in 1934 indicates the absence of *syncheilus* in that region. Instead *Catostomus catostomus griseus* is found on both sides of the Continental Divide. So far we have not had the opportunity to investigate the eastward extension of the range of *Catostomus syncheilus syncheilus* in the Columbia system nor the western range of *Catostomus catostomus griseus*, which is closely related to *Catostomus pocatello* of Idaho and perhaps the same species.

Catostomus syncheilus palouseanus, new subspecies.

Holotype.—A specimen 110 mm. long to base of caudal fin, collected in Smokle Creek, north of Almota, and 14 miles west of Pullman, Washington, on August 28, 1932, by Leonard P. Schultz and Marvin Bowers; Cat. no. 3764, Collection of Fishes, School of Fisheries, University of Washington, Seattle.

The numerous paratypes were collected in Washington by the senior author, Marvin Bowers, and Leo Erkila, as follows: from the type locality: Palouse River 2 miles above Colfax; South Fork Palouse River, 2 miles, and ½ mile above Pullman; Palouse River near Hooper; Palouse River between Lancaster and Endicott; and the Palouse River at Palouse.

Description based on the 125 mm. holotype and on numerous paratypes. The measurements of the holotype are given outside the parenthesis, and the range and average for 19 paratypes are in the parenthesis. These range in length from 101 to 120 mm. All measurements are expressed in hundredths of the standard length. Additional counts were made on other

paratypes as given in Table I. The greatest depth of the body is 23.1 (range 19.3 to 24.1; average 22.5) which is at the origin of the dorsal fin; the depth of the body is about a third greater than its width; the least depth of the moderately constricted caudal peduncle is 9.9 (7.7 to 9.9; 8.4); the length of the head is 24.5 (21.0 to 25.4; 23.2); the head is a little wider than deep at the occiput; the snout is rounded and extends a little forward of the upper lip; the anterior edge of the eye is a trifle in front of one half the length of the head, it is located far up dorsally on the head; the length of the snout is 11.3 (10.2 to 12.5; 11.1); the interorbital is flattish, only moderately convex, the least width is 10.0 (8.9 to 10.9; 9.8); the diameter of the eye is 4.5 (3.5 to 5.5; 4.3); the posterior margin of the dorsal fin is slightly concave, the distance from tip of snout to its origin is 51.3 (46.4 to 52.9; 50.0); the distance from the tip of the snout to the insertion of the pelvic fin is 59.1 (52.8 to 60.1; 56.6); this fin is slightly rounded posteriorly; the length of the mouth (measured from the anterior center to rear edge of lip) is 7.7 (6.7 to 8.6; 7.6); the width of the mouth is 10.0 (8.3 to 10.9; 9.8); the length of the caudal peduncle is 15.4 (13.8 to 17.8; 15.9).

The lips of *palouseanus* are exactly like those of *syncheilus*, therefore, we quote the description by Hubbs and Schultz (1932 : 12):

> "The upper lip has the outer and inner faces separated by a sharp edge toward the middle of the mouth but not at the angles. The outer face of the upper lip [of large adults] is papillo-plicate; the edge is strongly crenate, and the inner face bears two rows of large papillae opposite the edge of upper jaw. Toward the angle of the mouth the rows of papillae become more numerous. Here the upper lip shows little tendency to overlap the lower, as both lips flatten out to a common plane. The marginal indentation between the lips is but slightly developed. [To this we add that the young and half-grown of both subspecies have a well defined notch or marginal indentation at the outer corner where the upper and lower lips join.] The lower lip is only moderately incised, leaving room for from two to four rows to cross the mid-line in advance of the point of the incision. The papillae of the lower lip are large, round and isolated forward, but distally they become lower, oval and seriated into radial rows. The edges of the jaws are hard and rather sharp, and rather weakly curved. The ends of the hardened edges do not form conspicuous angles, but merge into the structure of the jaw."

The scales are small anteriorly, and enlarge gradually from below the region of the dorsal fin posteriorly. There are 120 (104 to 121; average 113.9) oblique rows of scales on the side of the body from upper edge of opercular opening to base of caudal fin rays. The scales above the lateral line (origin of dorsal obliquely downward and backward to lateral line) number 22 (18 to 25; 22.4); those below the lateral line (insertion of pelvic fins obliquely upward to lateral line) number 22 (17 to 23; 20.0). In front of the dorsal fin there are 59 (45 to 60); 53.5) scales, and behind the dorsal fin there are 48 (39 to 50; 44.1) scales. The fin rays are as follows: dorsal 12 (11 or 12; 11.1); anal 7 (7); pectoral 18 (17 or 18; 17.75). For additional counts of both subspecies see Table I.

The color of the body of *palouseanus* is mottled dark brown above, paler below. The blotches occur on the sides as is usual in the young of most of

the species of suckers. The peritoneum is jet black in the young and yearlings as well as in most of the adults, although occasionally an adult will have the peritoneum a little lighter than jet black, but not much. The color of the peritoneum of *syncheilus* is the same as in *palouseanus*.

Since Hubbs and Schultz (1932) have separated *Catostomus syncheilus syncheilus* from all other known species of fine-scaled suckers, it is only necessary for us to distinguish *C. s. palouseanus* from *C. s. syncheilus*. In *palouseanus* numerous proportions of the body and other structures were carefully compared with *syncheilus* and found not to differ significantly. The two subspecies differ (see Table I) in regard to the average number of scales, in the lateral line, above the lateral line, below the lateral line, before the dorsal fin, and behind the dorsal fin. *C. s. palouseanus* always averages more than *C. s. syncheilus*. The number of dorsal rays in *palouseanus* average 11.1 while in *syncheilus* they average 11.9.

The *character index* may be used to separate closely related forms as was done by Schultz and Welander (1934) and Schultz and Schaefer (1936). In this case the *character index* is equal to a sum of the number of oblique rows of scales on the side of the body + the number of scales above the lateral line + the number of scales below the lateral line + the number of scales before the dorsal + the number of scales behind the dorsal fin — the dorsal fin rays, for each individual. Thus, we add together the many small differences to form a frequency distribution, Table II. An examination of the data in this table indicates an average difference of 26.8 for the *character index* between the two subspecies.

TABLE I. Counts of *Catostomus syncheilus syncheilus* from the lower Snake River and its tributaries, the middle Columbia River and its tributaries, and of *Catostomus syncheilus palouseanus* from the Palouse River and one of its tributaries, Smokle Creek.

Number of scales in the lateral line:
C. s. syncheilus: 41 specimens, 88 to 115 (average 102.8).
C. s. palouseanus: 21 specimens, 104 to 121 (113.8).
Number of scales above the lateral line:
C. s. syncheilus: 41 specimens, 16 to 23 (20.1).
C. s. palouseanus: 21 specimens, 18 to 29 (22.4).
Number of scales below the lateral line:
C. s. syncheilus: 41 specimens, 14 to 21 (16.7).
C. s. palouseanus: 21 specimens, 17 to 23 (19.96).
Number of scales before the dorsal fin:
C. s. syncheilus: 31 specimens, 39 to 60 (49.1).
C. s. palouseanus: 20 specimens, 45 to 60 (53.5).
Number of scales behind the dorsal fin:
C. s. syncheilus: 32 specimens, 29 to 44 (38.1).
C. s. palouseanus: 20 specimens, 39 to 50 (44.1).
Number of dorsal rays:
C. s. syncheilus: 78 specimens, 10 to 13 (11.9).
C. s. palouseanus: 21 specimens, 11 or 12 (11.1).

Number of anal rays:

C. s. syncheilus: 64 specimens, always 7 rays.

C. s. palouseanus: 21 specimens, always 7 rays.

Number of pectoral rays:

C. s. syncheilus: 16 specimens, 17 to 19 (17.81).

C. s. palouseanus: 16 specimens, 17 or 18 (17.75).

TABLE II. The character index.

	176 to 185	186 to 195	196 to 205	206 to 215	216 to 225	226 to 235	236 to 245	246 to 255	256 to 265	Total	Average
C. s. syncheilus	2	1	3	7	11	5	2	....	....	31	215.7
C. s. palouseanus	....	....	....	....	1	4	8	4	3	20	242.5

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